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Transmitted herewith for filing is the Patent Application of:

Inventor: Cary Lee Bates et al.

For: **CLICK AHEAD BROWSER FUNCTION**

Enclosed are:

- ☒ Patent Specification - 22 pages
- ☒ Claims - 6 pages
- ☒ Abstract - 1 page
- ☒ Informal Drawings - five (6) sheets
- ☒ Declaration and Power of Attorney
- ☒ An assignment of the invention to International Business Machines Corporation (includes Recordation Form Cover Sheet)
- ☐ A certified copy of a ☐ application
- ☐ Information Disclosure Statement, PTO 1449 and copies of references

The filing fee has been calculated as shown below:

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By Jack V. Musgrove
 Jack V. Musgrove
 Registration No. 31,986
 FELSMAN, BRADLEY, VADEN, GUNTER
 & DILLON, LLP
 Suite 350, Lakewood on the Park
 7600B North Capital of Texas Highway
 Austin, Texas 78731
 Telephone (512) 343-6116

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CLICK AHEAD BROWSER FUNCTION

BACKGROUND OF THE INVENTION

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1. Technical Field:

The present invention generally relates to computer systems, specifically to a method of accessing information that is retrieved across a network, such as the Internet, and more particularly to a method of improving the performance of browsing software in following a chain of links to a destination document, such as hypertext links for visiting pages on the World Wide Web.

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2. Description of Related Art:

A generalized client-server computing network 2 is shown in **Figure 1**. Network 2 has several nodes or servers 4, 6, 8 and 10 which are interconnected, either directly to each other or indirectly through one of the other servers. Each server is essentially a stand-alone computer system (having one or more processors, memory devices, and communications devices), but has been adapted (programmed) for one primary purpose, that of providing information to individual users at another set of nodes, or workstation clients 12. A client is a member of a class or group of computers or computer systems that uses the services of another class or group to which it is not related. Clients 12 can also be stand-alone computer systems (like personal computers, or PCs), or "dumber" systems adapted for limited use with network 2 (like network computers, or NCs). A single, physical computer can act as both a server and a client,

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although this implementation occurs infrequently.

5 The information provided by a server can be in the
form of programs which run locally on a given client 12,
or in the form of data such as files that are used by
other programs. Users can also communicate with each
other in real-time as well as by delayed file delivery,
i.e., users connected to the same server can all
communicate with each other without the need for the
10 network 2, and users at different servers, such as
servers 4 and 6, can communicate with each other via
network 2. The network can be local in nature, or can be
further connected to other systems (not shown) as
indicated with servers 8 and 10.

15 The construction of network 2 is also generally
applicable to the Internet. In the context of a computer
network such as the Internet, a client is a process
(i.e., a program or task) that requests a service which
20 is provided by another program. The client process uses
the requested service without having to "know" any
working details about the other program or the service
itself. Based upon requests by the user, a server
presents filtered electronic information to the user as
25 server responses to the client process.

30 Conventional protocols and services have been
established for the Internet which allow the transfer of
various types of information, including electronic mail
via simple mail transfer protocol (SMTP), basic file
transfers via FTP (file transfer protocol), remote
computing via Telnet, "gopher" searching, Usenet
newsgroups, and hypertext file delivery and multimedia

streaming via the World Wide Web (WWW). A given server can be dedicated to performing one of these operations, or running multiple services. Internet services are typically accessed by specifying a unique address, or universal resource locator (URL). The URL has two basic components, the protocol to be used, and the object pathname. For example, the URL "http://www.uspto.gov" (home page for the United States Patent & Trademark Office) specifies a hypertext transfer protocol ("http") and a pathname of the server ("www.uspto.gov"). The server name is associated with a unique numeric value (a TCP/IP address, or "domain").

The present invention relates to the presentation of computer files that are distributed on a network like the Internet, but is particularly applicable to the WWW, which provides files that are conveniently linked for user access. For example, as illustrated in **Figure 2**, a group **14** of files or pages **16a-16h** are interrelated by providing hypertext links in each of the files (group **14** may thus be considered a typical "web site"). A hypertext link is an image or text that is viewable on the workstation's display **18**, which can be selected by the user (e.g., using a pointing device or "mouse") and which then automatically instructs client workstation **12** to request another page associated with that particular hypertext link (i.e., issue another URL). A hypertext link may appear as a picture, or as a word or sentence, possibly underlined or otherwise accentuated to indicate that it is a link and not just normal, informative text.

A WWW page may have text, graphic (still) images, and even multimedia objects such as sound recordings or

moving video clips. A hypertext page, if more than just text, is usually constructed by loading several separate files, e.g., the hypertext file "main.html" might include a reference to a graphic image file "picture.gif" or to a sound file "beep.wav". When a client workstation 12 sends a request to a server for a page, such as page 16a, the server first transmits (at least partially) the main hypertext file associated with the page, and then loads, either sequentially or simultaneously, the other files associated with the page. A given file may be transmitted as several separate pieces via TCP/IP protocol. The constructed page is then displayed on the workstation monitor 18 as shown in Figure 2. A page may be "larger" than the physical size of the monitor screen (i.e., larger than the software-programmed "window" provided for viewing the page), and techniques such as scroll bars are used by the viewing software (the web browser) to view different portions of the page. Different elements of the page (e.g., picture files) may be cached within the client workstation, that is, local copies kept, to simplify reloading of those elements if the browser retrieves a page that has been previously visited.

Web pages use field-based languages such as the hypertext markup language (HTML). This language provides a protocol for transmitting formatted information and control codes used to construct the "complete" page that is ultimately displayed by the browser. Different fields within the main HTML file are defined to store the formatted information and control code parameters, using tags. Tags not only mark elements, such as text and graphics, but can also be used to construct graphical

user interfaces within the web page (such as buttons that are "depressed" by selecting them using the graphical pointing device). In HTML, a tag is a pair of angle brackets (< >) that contain one or more letters and numbers between the angle brackets. One pair of angle brackets is often placed before an element, and another pair placed after, to indicate where the element begins and ends. For example, the language "TODAY ONLY<\B>" uses the "B" tag to provide a boldface formatting code for the words "TODAY ONLY." Tags may also be used to label a designated area of the page while a page element (such as a picture) is being downloaded and constructed within that area.

As mentioned above, some HTML pages include references to other HTML pages by using a special HTML tag referred to as an anchor tag or link. Hypertext links provide a convenient method for reaching additional informational material. As illustrated in **Figure 2**, a series of links can form a chain of pages, such as that formed by pages **16a**, **16b**, **16c**, and **16d**.

Oftentimes a user must traverse a relatively large number of pages in such a chain in order to retrieve a desired page. This procedure can take a long time, particularly if the computer or server is operating at a slower speed, or if the telecommunications lines are congested. One method of avoiding this problem is to use an electronic "bookmark" provided by the web browser, which records the network address of a desired page. In this manner, the user can select the address and proceed directly to that page without having to navigate through the path of hypertext links. Other problems arise, however, when attempting to use bookmarks. As more sites

are visited, bookmark lists quickly become cluttered and more difficult to use. In the situation wherein there are several pages related to a main ("home") page of a web site, many users still prefer to bookmark the home page and then branch out from there along the various link chains to find the pages.

It is also effectively impossible to bookmark some sites, such as those which use java applets to navigate through a site's pages (java is an object-oriented programming language, and is used to program small applications, or applets, for web pages in order to enhance their presentation). These sites actually force the user to always start at the home page, which may be desired by the site owner for various reasons, including legal notices, security, or marketing. The java applets then load requested pages without providing a different (unique) URL to the browser on which to base a bookmark for a page beyond the primary/home page.

In these various situations where the desired page is to be found via a chain of several links, the user must wait an inordinate amount of time for each hypertext page to download, before the next link in the chain can be selected. Some users will attempt to utilize this time more efficiently by opening up multiple browser windows, to simultaneously process more than one page request, but oftentimes all of the browser windows are locked or suspended while one page is waiting for download completion. It would, therefore, be desirable to provide a method of allowing a user to more quickly navigate through a chain of electronic document links, such as hypertext links for pages of the World Wide Web. It would be further advantageous if a user could select

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SUMMARY OF THE INVENTION

It is therefore one object of the present invention to provide an improved method of accessing information on a computer system.

It is another object of the present invention to provide such a method which allows a user to quickly navigate through a chain of electronic document links, such as hypertext links.

It is yet another object of the present invention to provide such a method in which the user does not need to wait for an electronic document to download prior to selecting a link that is contained in the document.

The foregoing objects are achieved in a method of accessing electronic documents, generally comprising the steps of storing, in a computer system, link information regarding one or more document links embedded in an electronic document, selecting the electronic document for retrieval by the computer system, and displaying the link information on a display screen of the computer system, prior to actually downloading the electronic document. The stored information is recorded at an earlier time when the electronic document had previously been loaded into the document viewer (e.g., web browser). In this manner, the link information can be displayed concurrently with the issuance of a request for the electronic document, so the user can see the link information as the document is downloading, and can further select a link contained within the displayed link information, prior to said downloading. The link information which is to be stored may include a universal

resource locator (URL) address associated with one of the document links embedded in the electronic document, or a java applet identifier associated with one of the document links. Additional information, such as an associated link label, may also be recorded. In particular, the document layout location of each link can be stored, so that the links are positioned within the document viewer at locations that correspond to the links in the actual electronic document. The link information can be updated if it has changed, after downloading the current version of the document.

The above as well as additional objectives, features, and advantages of the present invention will become apparent in the following detailed written description.

BRIEF DESCRIPTION OF THE DRAWINGS

The novel features believed characteristic of the invention are set forth in the appended claims. The invention itself however, as well as a preferred mode of use, further objects and advantages thereof, will best be understood by reference to the following detailed description of an illustrative embodiment when read in conjunction with the accompanying drawings, wherein:

Figure 1 is a diagram of a conventional computer network, including interconnected servers and client workstations;

Figure 2 is a pictorial representation of the retrieval of an object from a set of linked objects residing on the network, such as a page on the World Wide Web;

Figure 3 is an illustration of one embodiment of a data processing system in which the present invention can be practiced;

Figure 4 is a high-level block diagram illustrating selected components that can be included in the data processing system of **Figure 3** according to the teachings of the present invention; and

Figure 5A is a depiction of a computer display screen showing a document viewer (web browser) which has loaded a document (web page) having multiple document links;

Figure 5B is a depiction of the computer display screen of Figure 5A in which the document viewer is displaying a previously stored version of the document which contains information on the embedded document links; and

Figure 6 is a chart depicting the logic flow according to one implementation of the present invention.

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DETAILED DESCRIPTION OF AN ILLUSTRATIVE EMBODIMENT

The present invention is directed to a method of accessing information that is distributed across a computer network, such as a local area network (LAN), or the Internet. While the invention may therefore be understood with reference to the network illustrated in **Figure 1**, those skilled in the art will appreciate that application of the present invention is not limited to such a network. For example, the invention could also be applied to document access across a peer-to-peer network rather than a client-server network. Similarly, the present invention may be practiced using a client workstation such as a personal computer (PC), but these references should not be construed in a limiting sense.

With further reference to **Figure 3**, a data processing system **20** is shown in which the present invention can be practiced. The data processing system **20** includes processor **22**, keyboard **82**, and display **96**. Keyboard **82** is coupled to processor **22** by a cable **28**. Display **96** includes display screen **30**, which may be implemented using a cathode ray tube (CRT), a liquid crystal display (LCD), an electrode luminescent panel or the like. The data processing system **20** also includes pointing device **84**, which may be implemented using a track ball, a joy stick, touch sensitive tablet or screen, track path, or as illustrated a mouse. The pointing device **84** may be used to move a pointer or cursor on display screen **30**. Processor **22** may also be coupled to one or more peripheral devices such a modem **92**, CD-ROM **78**, network adapter **90**, and floppy disk drive

40, each of which may be internal or external to the enclosure or processor 22. An output device such as a printer 100 may also be coupled with processor 22.

5 Reference now being made to **Figure 4**, a high level block diagram is shown illustrating selected components that can be included in the data processing system 20 of **Figure 3** according to the teachings of the present invention. The data processing system 20 is controlled
10 primarily by computer readable instructions, which can be in the form of software, wherever, or by whatever means such software is stored or accessed. Such software may be executed within the Central Processing Unit (CPU) 50 to cause data processing system 20 to do work.

15 Memory devices coupled to system bus 5 include Random Access Memory (RAM) 56, Read Only Memory (ROM) 58, and nonvolatile memory 60. Such memories include circuitry that allows information to be stored and
20 retrieved. ROMs contain stored data that cannot be modified. Data stored in RAM can be changed by CPU 50 or other hardware devices. Nonvolatile memory is memory that does not lose data when power is removed from it. Nonvolatile memories include ROM, EPROM, flash memory, or
25 battery-pack CMOS RAM. As shown in **Figure 4**, such battery-pack CMOS RAM may be used to store configuration information.

30 An expansion card or board is a circuit board that includes chips and other electronic components connected that adds functions or resources to the computer.

Typically, expansion cards add memory, disk-drive controllers 66, video support, parallel and serial ports, and internal modems. For lap top, palm top, and other portable computers, expansion cards usually take the form of PC cards, which are credit card-sized devices designed to plug into a slot in the side or back of a computer. An example of such a slot is PCMCIA slot (Personal Computer Memory Card International Association) which defines type I, II and III card slots. Thus, empty slots 68 may be used to receive various types of expansion cards or PCMCIA cards.

Disk controller 66 and diskette controller 70 both include special purpose integrated circuits and associated circuitry that direct and control reading from and writing to hard disk drive 72, and a floppy disk or diskette 74, respectively. Such disk controllers handle tasks such as positioning read/write head, mediating between the drive and the CPU 50, and controlling the transfer of information to and from memory. A single disk controller may be able to control more than one disk drive.

CD-ROM controller 76 may be included in data processing 20 for reading data from CD-ROM 78 (compact disk read only memory). Such CD-ROMs use laser optics rather than magnetic means for reading data.

Keyboard mouse controller 80 is provided in data processing system 20 for interfacing with keyboard 82 and pointing device 84. Such pointing devices are typically used to control an on-screen element, such as a graphical

pointer or cursor, which may take the form of an arrow having a hot spot that specifies the location of the pointer when the user presses a mouse button. Other pointing devices include a graphics tablet, stylus, light pin, joystick, puck, track ball, track pad, and the pointing device sold under the trademark "Track Point" by International Business Machines Corp. (IBM).

Communication between processing system 20 and other data processing systems may be facilitated by serial controller 88 and network adapter 90, both of which are coupled to system bus 5. Serial controller 88 is used to transmit information between computers, or between a computer and peripheral devices, one bit at a time over a single line. Serial communications can be synchronous (controlled by some standard such as a clock) or asynchronous (managed by the exchange of control signals that govern the flow of information). Examples of serial communication standards include RS-232 interface, the RS-422 interface, and the universal serial bus (USB) interface. As illustrated, such a serial interface may be used to communicate with modem 92. A modem is a communication device that enables a computer to transmit information over standard telephone lines. Modems convert digital computer signals to interlock signals suitable for communications over telephone lines. Modem 92 can be utilized to connect data processing system 20 to an on-line information service or an Internet service provider. Such service providers may offer software that can be down loaded into data processing system 20 via modem 92. Modem 92 may provide a connection to other sources of software, such as a server, an electronic bulletin board (BBS), or the Internet (including the

World Wide Web).

Network adapter 90 may be used to connect data processing system 20 to a local area network 94. Network 94 may provide computer users with means of communicating and transferring software and information electronically. Additionally, network 94 may provide distributed processing, which involves several computers in the sharing of workloads or cooperative efforts in performing a task. Network 94 can also provide a connection to other systems like those mentioned above (a BBS, the Internet, etc.).

Display 96, which is controlled by display controller 98, is used to display visual output generated by data processing system 20. Such visual output may include text, graphics, animated graphics, and video. Display 96 may be implemented with CRT-based video display, an LCD-based flat panel display, or a gas plasma-based flat-panel display. Display controller 98 includes electronic components required to generate a video signal that is sent to display 96.

Printer 100 may be coupled to data processing system 20 via parallel controller 102. Printer 100 is used to put text or a computer-generated image (or combinations thereof) on paper or on another medium, such as a transparency sheet. Other types of printers may include an image setter, a plotter, or a film recorder. Parallel controller 102 is used to send multiple data and control bits simultaneously over wires connected between system

bus 5 and another parallel communication device, such as printer 100.

CPU 50 fetches, decodes, and executes instructions, and transfers information to and from other resources via the computers main data-transfer path, system bus 5.

Such a bus connects the components in a data processing system 20 and defines the medium for data exchange.

System bus 5 connects together and allows for the exchange of data between memory units 56, 58, and 60, CPU 50, and other devices as shown in **Figure 4**. Those skilled in the art will appreciate that a data processing system constructed in accordance with the present invention may have multiple components selected from the foregoing, including even multiple processors.

Referring now to **Figures 5A** and **5B**, the present invention provides a novel method of locating and viewing documents distributed across a network, using computer system 20. Computer system 20 includes a document viewer 110 shown on display screen 30, which allows the user to more rapidly navigate through a series of linked documents in order to view a final destination document. In particular, document viewer 110 may be a web browser adapted to retrieve and display pages which contain hypertext links from the Internet. Document viewer 110, in the form of object code (a software program), may be stored in the computer system's permanent memory device 72 and loaded into RAM 56 during use. The programming details of document viewer 110 are not discussed herein, but shall become apparent to one skilled in the art upon

reference to the following disclosure.

5 The present invention enables quicker navigation through a web site by allowing document viewer 110 to store information about pages that have previously been visited, specifically, information regarding the links that are embedded in these pages. **Figure 5A** illustrates a page 112 which has been fully loaded by browser 110, and which contains five hypertext links to other documents. The first three links 114, 116 and 118 are shown in separate fields, while a fourth link 120 is embedded in a text field 122, and a fifth link 124 is embedded in an image field 126. These links may be selected using the graphical pointer 128 controlled by pointing device 84. Page 112 has other non-link features such as the static image 130. When document viewer 110 first loads page 112, it stores information regarding all five of these links. While it is only necessary to record the URL for each link, the invention preferably also records any associated label or image-related description, and the location of the link within the web page (i.e., the document layout). The link information for each page may be conveniently stored in a "visited pages" table indexed by the URL of each page.

25 In this manner, when the user requests page 112 at a later time, the embedded links can be presented on screen 30 before computer system 20 receives a response from network 94, as illustrated in **Figure 5B**. In the snapshot image of **Figure 5B**, the user has selected a hypertext link for page 112 from another document, or entered the

URL of this page in the location field **132** to begin the downloading process, as indicated by the now highlighted "Stop" button **134**. However, prior to receiving the current page information from the web site, and even prior to receiving any form of acknowledgment from network **94**, browser **110** automatically loads a "link-only" version **112'** of the original page. Page **112'** includes all five of the hypertext links found in the original page, and positioned at the same respective locations. While the remainder of the page need not be displayed (e.g., the image **130** or text **122**), some additional features may be shown such as an image label **136** that is associated with the fifth hypertext link **124**.

The links displayed in the link-only page **112'** are also selectable using graphical pointer **128**, but their selection is preferably subject to verification of the link upon completion of the downloading of the current version of the actual page **112**. Once the page downloads, if the link information is still valid (i.e., the same URL is associated with a link at the same location), then browser **110** proceeds with requesting the page associated with that link. This verification procedure can be performed in the background, however, so as to allow the user to select many sequential links in a series of interrelated pages prior to downloading even one page. In other words, the user may quickly jump ahead to a final destination page by selecting a series of links in different link-only pages.

Where the user has jumped ahead many pages beyond the page that is currently being downloaded by browser

110, it is not necessary to load page elements beyond the embedded links. For example, if the user has selected a link in link-only page 112' prior to the current version of that page being downloaded, then it is unnecessary to
5 continue the download process for that page, i.e., the full data for image 126 and image 130 need not be downloaded. Indeed, there is no need to ever display the page with its full elements if a link has already been selected, and if the page elements have not been altered
10 since the last time it was loaded. Once the user has navigated through the links to select a final destination document, the user may perform some other task while the pages download and the verifications are performed, if desired.

If a page has been altered since the last time it was loaded, it may be necessary to interrupt the navigation chain and display an altered page, particularly if the URL or location of a selected link
15 has changed. If the only changes to a page relate to non-link information, then it is not necessary to disrupt the quick navigation procedure. Also, if link information has changed, but not with regard to a specific link that was selected in the links-only version
20 of the page, then it is not necessary to disrupt the navigation chain since the selected link is still valid; in such a case, however, the remaining link information would be updated to reflect the current settings.

30 The foregoing implementation of the present invention may be further understood with reference to the flow chart of **Figure 6**. The process begins when a user originally retrieves an electronic document (140).

Document viewer 110 then records the document address along with the associated information on links embedded in the document (142). These steps may be repeated for many different pages. After some intervening activity (144), the user requests the same document for which link information has previously been stored (146). The browser then clears the viewing window and displays the links for the document, and sends a request for the first document to the network (148). While this first document is still downloading, the user may select one of the links in that document, as stored in the visited pages table (150). The browser again clears the viewing window and displays the links for the second requested page, and issues a request for the second document (152). Further links may be selected while downloading these documents (154), and the link information for each page can be updated as downloading progresses (156). Once the user has finished selecting all of the links in the chain (158), the current version of the final linked document is displayed after downloading (160).

Although the invention has been described with reference to specific embodiments, this description is not meant to be construed in a limiting sense. Various modifications of the disclosed embodiments, as well as alternative embodiments of the invention, will become apparent to persons skilled in the art upon reference to the description of the invention. For example, the invention is not limited to storing a URL of a link, but is also applicable to pages which are accessed using java applets, where the links have no URL's per se. In the case where a web site is using java to control access,

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CLAIMS

1 1. A method of accessing electronic documents,
2 comprising the steps of:
3 storing, in a computer system, link information
4 regarding one or more document links embedded in an
5 electronic document;
6 selecting the electronic document for retrieval by
7 the computer system;
8 in response to said selecting step, displaying the
9 link information on a display screen of the computer
10 system, and issuing a request for the electronic document
11 to a network connected to the computer system; and
12 in response to said issuing step, downloading the
13 electronic document.

1 2. The method of Claim 1 further comprising the step
2 of selecting a link contained within the displayed link
3 information, prior to said downloading step.

1 3. The method of Claim 1 wherein said storing step
2 stores at least one universal resource locator address
3 associated with one of the document links embedded in the
4 electronic document.

1 4. The method of Claim 1 wherein said storing step
2 stores at least one java applet identifier associated
3 with one of the document links embedded in the electronic
4 document.

1 5. The method of Claim 1 further comprising the step
2 of updating the link information after said downloading
3 step.

6. The method of Claim 1 wherein said storing step stores at least one link label associated with one of the document links embedded in the electronic document.

7. The method of Claim 1 wherein said storing step stores at least one document layout location associated with one of the document links embedded in the electronic document.

8. The method of Claim 7 wherein said displaying step positions the one document link at the document layout location.

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120	2121	2122	2123	2124	2125	2126	2127	2128	2129	2130	2131	2132	2133	2134	2135	2136	2137	2138	2139	2140	2141	2142	2143	2144	2145	2146	2147	2148	2149	2150	2151	2152	2153	2154	2155	2156	2157	2158	2159	2160	2161	2162	2163	2164	2165	2166	2167	2168	2169	2170	2171	2172	2173	2174	2175	2176	2177	2178	2179	2180	2181	2182	2183	2184	2185	2186	2187	2188	2189	2190	2191	2192	2193	2194	2195	2196	2197	2198	2199	2200	2201	2202	2203	2204	2205	2206	2207	2208	2209	2210	2211	2212	2213	2214	2215	2216	2217	2218	2219	2220	2221	2222	2223	2224	2225	2226	2227	2228	2229	2230	2231	2232	2233	2234	2235	2236	2237	2238	2239	2240	2241	2242	2243	2244	2245	2246	2247	2248	2249	2250	2251	2252	2253	2254	2255	2256	2257	2258	2259	2260	2261	2262	2263	2264	2265	2266	2267	2268	2269	2270	2271	2272	2273	2274	2275	2276	2277	2278	2279	2280	2281	2282	2283	2284	2285	2286	2287	2288	2289	2290	2291	2292	2293	2294	2295	2296	2297	2298	2299	2300	2301	2302	2303	2304	2305	2306	2307	2308	2309	2310	2311	2312	2313	2314	2315	2316	2317	2318	2319	2320	2321	2322	2323	2324	2325	2326	2327	2328	2329	2330	2331	2332	2333	2334	2335	2336	2337	2338	2339	2340	2341	2342	2343	2344	2345	2346	2347	2348	2349	2350	2351	2352	2353	2354	2355	2356	2357	2358	2359	2360	2361	2362	2363	2364	2365	2366	2367	2368	2369	2370	2371	2372	2373	2374	2375	2376	2377	2378	2379	2380	2381	2382	2383	2384	2385	2386	2387	2388	2389	2390	2391	2392	2393	2394	2395	2396	2397	2398	2399	2400	2401	2402	2403	2404	2405	2406	2407	2408	2409	2410	2411	2412	2413	2414	2415	2416	2417	2418	2419	2420	2421	2422	2423	2424	2425	2426	2427	2428	2429	2430	2431	2432	2
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1 9. A computer system comprising:
2 means for processing program instructions;
3 a display screen connected to said processing means;
4 means for interconnecting said processing means to a
5 network;
6 means for storing link information regarding one or
7 more document links embedded in an electronic document,
8 said electronic document being remotely located on the
9 network; and
10 means for displaying the link information on said
11 display screen in response to selection of the electronic
12 document for retrieval, prior to downloading of the
13 electronic document from the network.

1 10. The computer system of Claim 9 further
2 comprising means for issuing a request to download the
3 electronic document from the network, in response to
4 selection of the electronic document for retrieval.

1 11. The computer system of Claim 10 further
2 comprising means for selecting a link contained within
3 the displayed link information, prior to downloading the
4 electronic document.

1 12. The computer system of Claim 10 further
2 comprising means for updating the link information after
3 downloading the electronic document.

1 13. The computer system of Claim 9 wherein said
2 storing means stores at least one universal resource
3 locator address associated with one of the document links
4 embedded in the electronic document.

1 14. The computer system of Claim 9 wherein said

[illegible]

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- 4

- 1
- 2

1 18. A computer program product comprising:
2 a storage medium adapted to be read by a computer;
3 and
4 program means stored on said storage medium for
5 storing link information regarding one or more document
6 links embedded in an electronic document which is located
7 remote from the computer, and for displaying the link
8 information on a display screen of the computer in
9 response to selection of the electronic document for
10 retrieval, prior to downloading of the electronic
11 document to the computer.

1 19. The computer program product of Claim 18 wherein
2 said program means further allow selection of a link
3 contained within the displayed link information, prior to
4 downloading the electronic document.

1 20. The computer program product of Claim 18 wherein
2 said program means further provide for updating the link
3 information after downloading the electronic document.

1 21. The computer program product of Claim 18 wherein
2 said program means, in storing the link information,
3 stores at least one universal resource locator address
4 associated with one of the document links embedded in the
5 electronic document.

1 22. The computer program product of Claim 18 wherein
2 said program means, in storing the link information,
3 stores at least one java applet identifier associated
4 with one of the document links embedded in the electronic
5 document.

1 23. The computer program product of Claim 18 wherein

said program means, in storing the link information, stores at least one link label associated with one of the document links embedded in the electronic document.

24. The computer program product of Claim 18 wherein said program means, in storing the link information, stores at least one document layout location associated with one of the document links embedded in the electronic document.

25. The computer program product of Claim 24 wherein said program means, in displaying the link information, positions the one document link at the document layout location.

ABSTRACT OF THE DISCLOSURE
CLICK AHEAD BROWSER FUNCTION

A method of accessing remote electronic documents, such as those stored on a network, by recording link information regarding one or more document links embedded in an electronic document, selecting the electronic document for retrieval by the computer system, and displaying the link information on a display screen, prior to downloading the electronic document. The link information is recorded at an earlier time when the electronic document had previously been loaded into the document viewer. The link information can thus be displayed concurrently with the issuance of a request for the electronic document, so the user can see the link information as the document is downloading, and can further select a link contained within the displayed link information, prior to downloading the document. The link information may include a universal resource locator (URL) address associated with one of the document links, or a java applet identifier associated with one of the links. The link information can be updated if it has changed, after downloading the current version of the document.

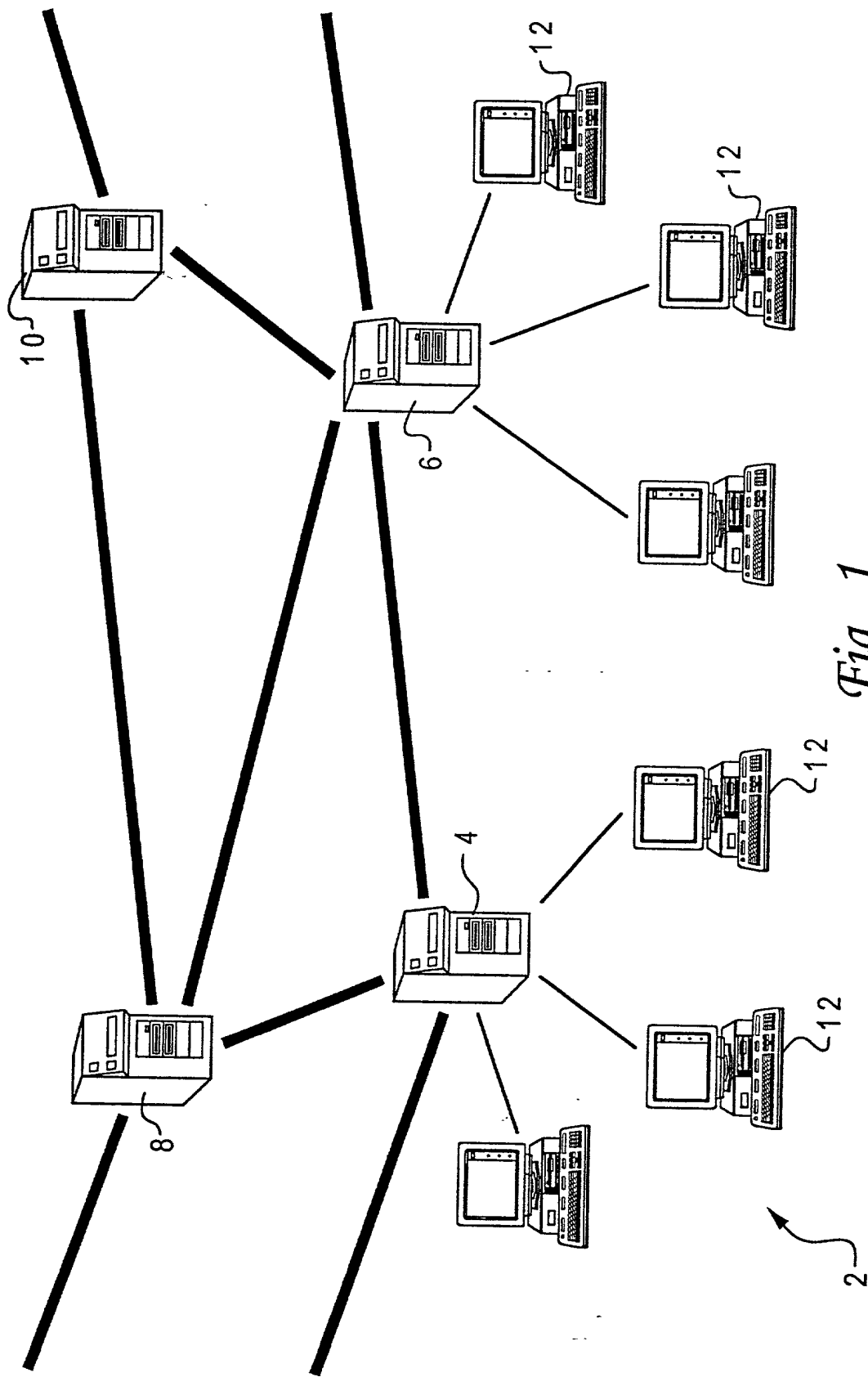
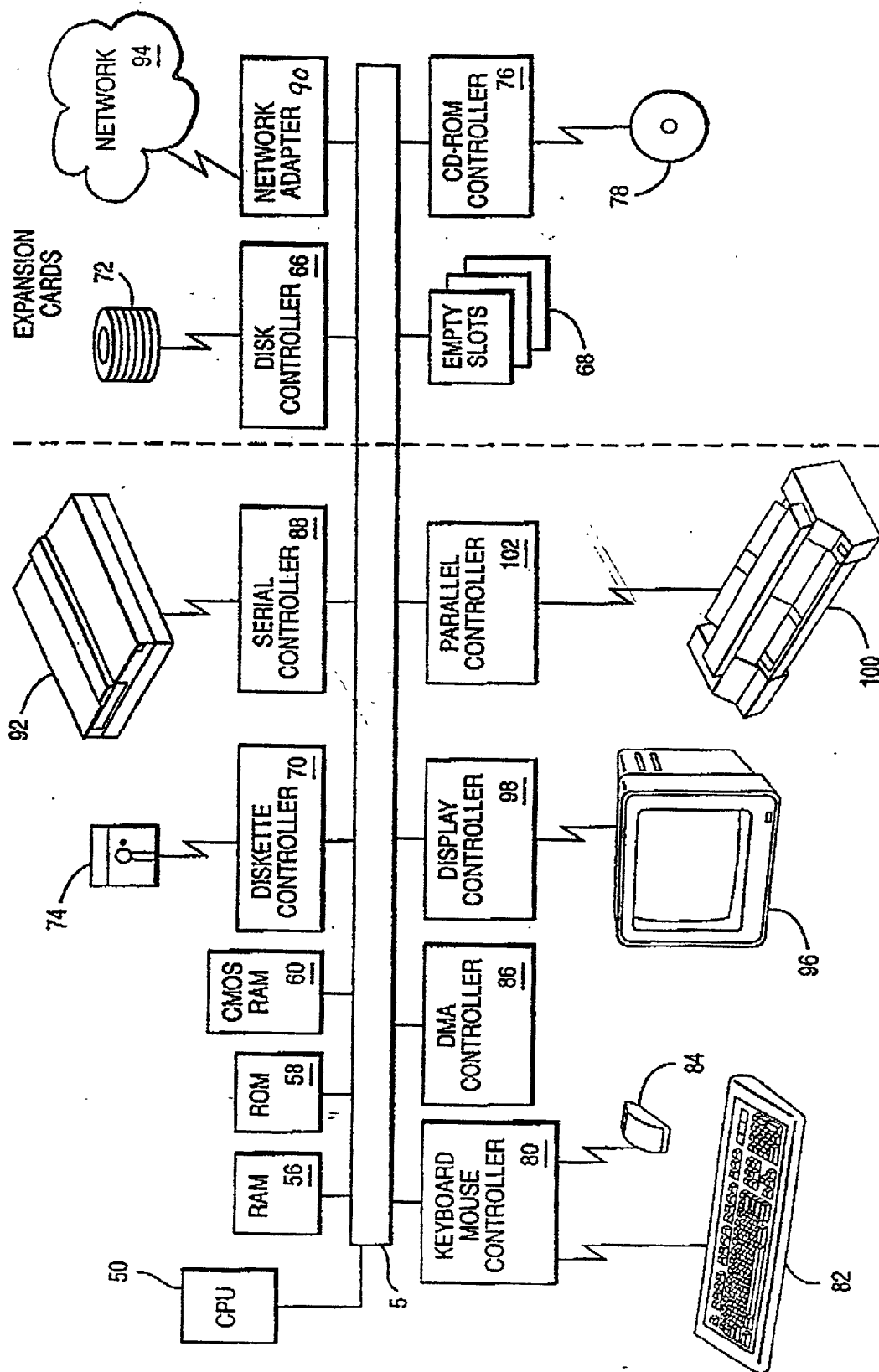


Fig. 1 *Prior Art*



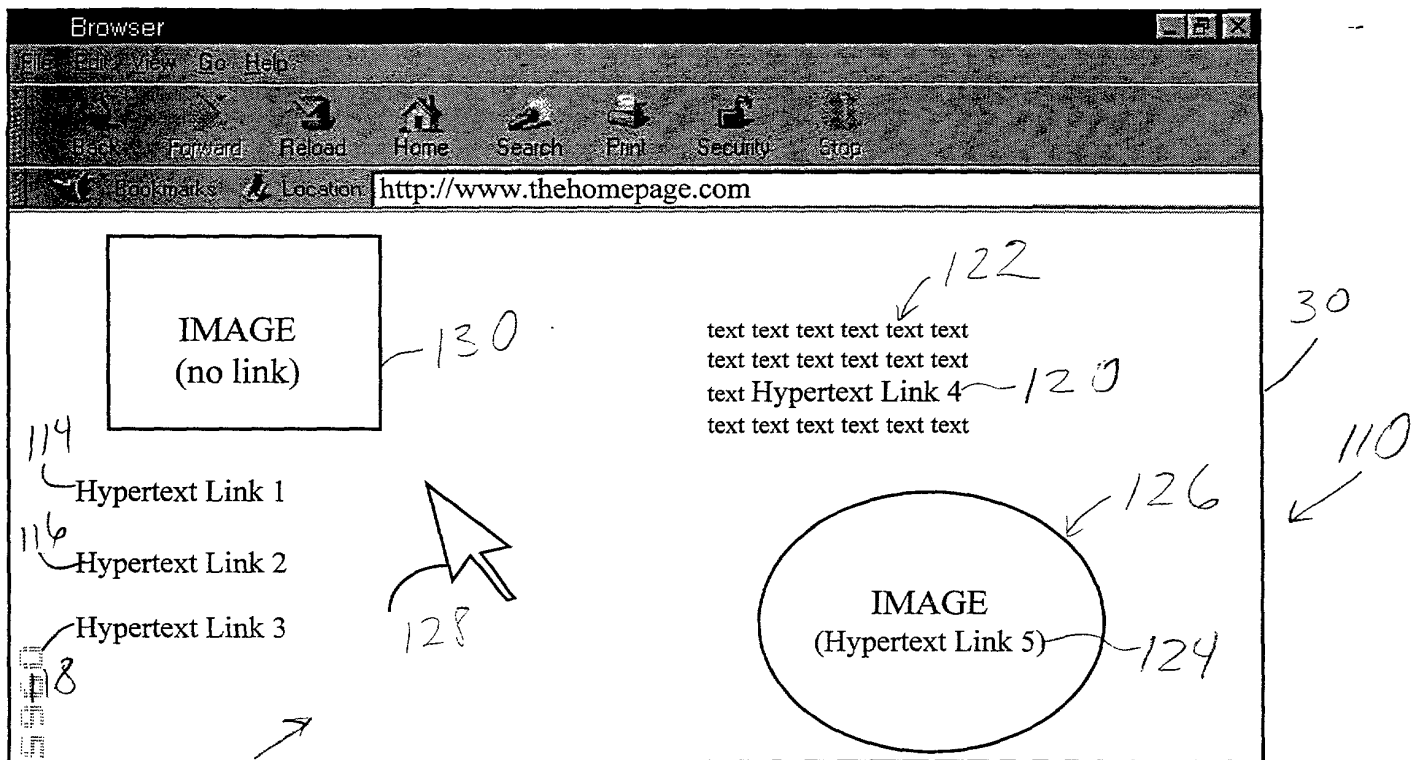


Figure 5A

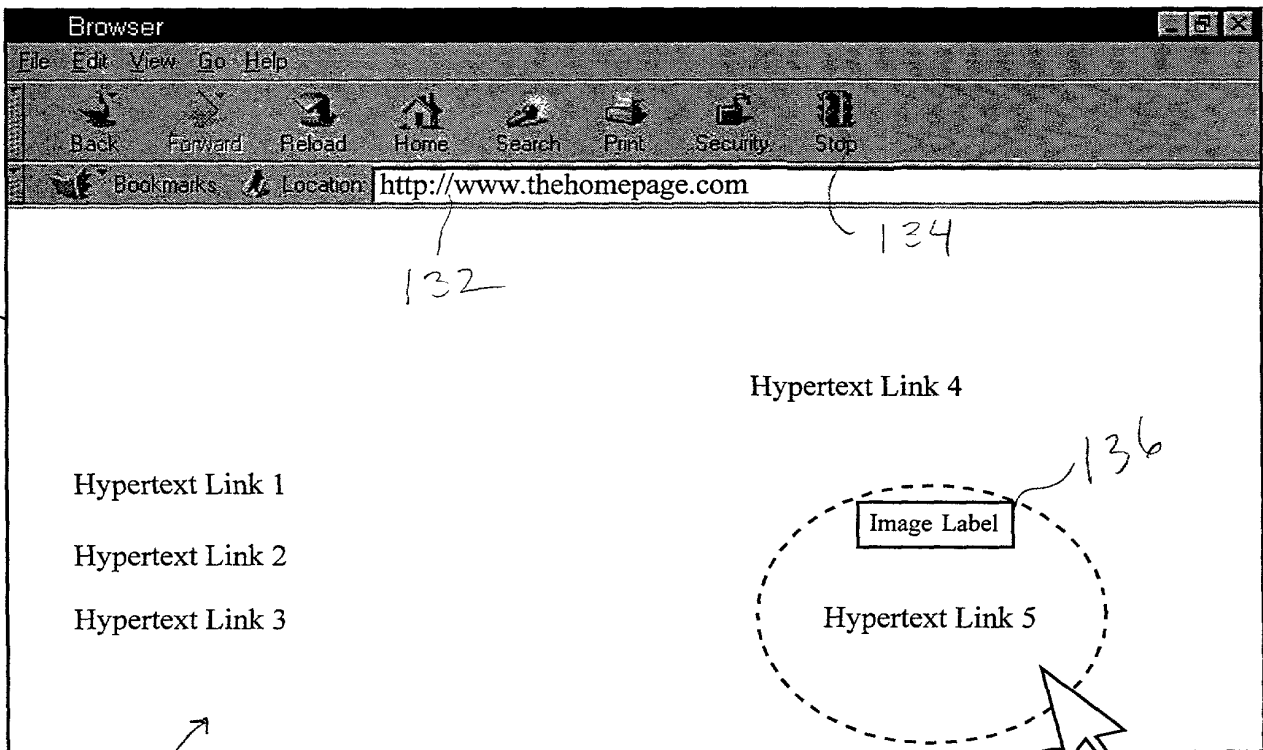


Figure 5B

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graph TD
    140[RETRIEVE ELECTRONIC DOCUMENT] --> 142[RECORD DOCUMENT ADDRESS, ASSOCIATE LINK INFORMATION]
    142 --> 144[INTERVENING ACTIVITY]
    144 --> 146[REQUEST FIRST DOCUMENT]
    146 --> 148[CLEAR VIEWING WINDOW, DISPLAY LINKS, SEND REQUEST FOR FIRST DOCUMENT]
    148 --> 150[SELECT LINK (WHILE DOWNLOADING FIRST DOCUMENT)]
    150 --> 152[CLEAR VIEWING WINDOW, DISPLAY LINKS, SEND REQUEST FOR LINKED DOCUMENT]
    152 --> 154[SELECT LINK (WHILE DOWNLOADING DOCUMENTS)]
    154 --> 156[UPDATE LINK INFORMATION AS DOWNLOADING COMPLETES]
    156 --> 158{FINISHED LINK CHAIN}
    158 --> 154
    158 --> 160[DISPLAY CURRENT VERSION OF FINAL LINKED DOCUMENT]

```

Figure 6

**DECLARATION AND POWER OF ATTORNEY FOR
PATENT APPLICATION**

As a below-named inventors, we hereby declare that:

The residence, post office address and citizenship are as stated below next to each name;

We believe we are the original, first and joint inventors of the subject matter which is claimed and for which a patent is sought on the invention entitled

CLICK AHEAD BROWSER FUNCTION

the specification of which (check one)

X is attached hereto.
_____ was filed on _____
as Application Serial No. _____
and was amended on _____ (if applicable).

We hereby state that we have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

We acknowledge the duty to disclose information which is material to the patentability of this application in accordance with Title 37, Code of Federal Regulations, §1.56.

We hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s): _____ Priority Claimed

_____ Yes _____ No
(Number) (Country) (Day/Month/Year)

We hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose information material to the patentability of this application as defined in Title 37, Code of Federal Regulations, §1.56 which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial #)

(Filing Date)

(Status)

We hereby declare that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

POWER OF ATTORNEY: As a named inventors, we hereby appoint the following attorneys and/or agents to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

John E. Hoel, Reg. No. 26,279;
Christopher A. Hughes, Reg. No. 26,914;
Pryor A. Garnett, Reg. No. 32,136;
James R. Nock, Reg. No. 42,937;
Joseph C. Redmond, Jr., Reg. No. 18,753;
Steven W. Roth, Reg. No. 34,712;
Roy W. Truelson, Reg. 34,265

Matthew S. Anderson, Reg. No. 39,093;
Matthew W. Baca, Reg. No. 42,277;
Michael R. Barré, Reg. No. 44,023;
Andrew J. Dillon, Reg. No. 29,634;
John G. Graham, Reg. No. 19,563;
Andrew M. Harris, Reg. No. 42,638;
Steven Lin, Reg. No. 35,250;
Richard N. McCain, Reg. No. 43,785;
Jack V. Musgrove, Reg. No. 31,986;
Antony P. Ng, Reg. No. 43,427;
Michael E. Noe, Reg. No. 44,975;
Brian F. Russell, Reg. No. 40,796;
Daniel E. Venglarik, Reg. No. 39,409; and
Sidney L. Weatherford, Reg. No. 45,602.

Send correspondence to: Andrew J. Dillon, FELSMAN, BRADLEY, VADEN, GUNTER & DILLON, LLP, Suite 350, Lakewood on the Park, 7600B North Capital of Texas Highway, Austin, Texas 78731, and direct all telephone calls to Andrew J. Dillon, (512) 343-6116.

FULL NAME OF SOLE OR FIRST INVENTOR: Cary Lee Bates

INVENTORS SIGNATURE: *Cary Lee Bates* DATE: 8-21-00

RESIDENCE: 450 73rd Street N.W.
Rochester, MN 55901

CITIZENSHIP: US

POST OFFICE ADDRESS: 450 73rd Street N.W.
Rochester, MN 55901

DOCKET NUMBER: ROC920000109US1

FULL NAME OF **SECOND** INVENTOR: John Matthew Santosuosso

INVENTORS SIGNATURE:  DATE: 8-21-00

RESIDENCE: 1402 30th Street N.W.
Rochester, MN 55901

CITIZENSHIP: US

POST OFFICE ADDRESS: 1402 30th Street N.W.
Rochester, MN 55901